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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,374	07/31/2001	Christopher M. Jones	CY 0021	4281

7590

07/16/2003

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EXAMINER

RAO, SHRINIVAS H

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/920,374

Applicant(s)

JONES ET AL.

Examiner

Steven H. Rao

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

R sponse to Amendment

Applicants' amendment faxed on April 28, 2003 has been entered on April 29, 2003.

Therefore claims 1-20 as originally filed are currently pending in the Application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 to 4 and 6 to 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen (U.S. Patent No. 6,303,459 herein after Chen). (the previous rejection has been reproduced below for response to Applicants' arguments- see response to arguments section below).

With respect to claim 1, a method of verifying a reticle including the steps of : forming a conformal layer over a non-resist deposited layer (Chen figure 1 # 16 over non-resist layer 14) that is formed on a uniform surface (Chen fig. 1 # 10), the deposited layer including the reticle pattern (Chen col. 2 lines 49 to 55) and inspecting the reticle pattern for defects (Chen col. 2 lines 60 to 63).

With respect to claims 2 and 3, wherein the conformal layer comprises a conductive material namely titanium (Chen fig. 1 # 16, col. 5 lines 66 to col. 6 lines 4).

With respect to claim 4, wherein the conformal layer comprises a layer of titanium nitride formed over a layer of titanium. (Chen col. 6 line 5-6 and col. 5 lines 66 to col. 6 lines 4).

With respect to claim 6, wherein conformal layer has a thickness of no more than 1000° A. (Chen col. 6 line 4 $500-1000^{\circ}$ A).

With respect to claim 7 the deposited layer is silicon oxide (Chen col. 5 lines 59-60).

With respect to claim 8, wherein the deposited layer comprises of layer of undoped silicon dioxide formed on a layer of phosphosilicate glass (PSG). (Chen col. 7 lines 1-3 silicon dioxide layer and col. 5 lines 65 to col. 6 line 5- PSG layer).

With respect to claims 9 and 10 wherein the thickness of the deposited layer is 2500 or 5000° A. (Chen col. 8 lines deposited layer –3000 to 8000° A).

With respect to claim 11, wherein the uniform substrate comprises a silicon substrate . (Chen fig. 1 # 10, col. 5 line 55)

With respect to claim 12, Chen describes a method of verifying a reticle including the steps of : forming a conductive conformal layer greater than 100° A over a deposited pattern layer with a reticle (Chen fig. 1 # 16, col. 6 lines 26 100° A over a patterned layer 14 with reticle) and inspecting the pattern in the deposited layer (Chen col. 2 lines 60-66).

With respect to claim 13, wherein inspecting the pattern comprises automatically inspecting the pattern with pattern inspecting equipment (Chen col. 2 lines 58 to 60).

With respect to claim 14, wherein automatically inspecting the pattern includes automatically aligning the wafer in the pattern inspection equipment with the pattern formed in the deposited layer. (Chen col. 2 lines 58 to 64, col. 2 lines 52-55).

With respect to claim 15, wherein the reticle comprises a contact reticle pattern (Chen col. 3 lines 20 to 35).

With respect to claim 16, wherein the patterning of the deposited layer with the reticle includes : patterning a layer of resist formed over the deposited layer with the reticle pattern (Chen col. 3 lines 20-25), etching the deposited layer (Chen figure 3 col. 6 lines 27 to 46) removing the resist (Chen figs. 2 and 3 , during the etching of layer 16).

With respect to claim 17, Chen describes a method including the steps of forming at least one reticle patterned layer on a uniform surface (Chen col.2 lines 50 to 55 and col. 5 lines 54-55 –uniform surface), increasing an inspection contrast between the patterned and non-patterned portions of reticle patterned layer by forming a conformal layer over the reticle patterned layer (Chen col. 6 lines 9 to 46) and inspecting the reticle patterned layer (Chen col. 2 lines 50 to 65).

With respect to claim 18, wherein the at least one reticle patterned layer on a uniform surface comprises depositing silicon oxide containing layer (Chen col. 5 lines 59-61).

With respect to claim 19, wherein the conformal layer comprises depositing a conductive conformal layer (Chen col. 5 lines 59-61).

With respect to claim 20, wherein the conductive conformal layer comprises an interconnect adhering layer (Chen col.1 lines 60-61, col. 2 lines 64-66, col. 5 lines 27-30).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as applied to claims above and further in view of Leedy (U.S. Patent No. 5,985,693 herein after Leedy).

With respect to claim 5, wherein the reticle pattern in the deposited layer includes features having a minimum size L and the conformal layer has a thickness of no more than 2L.

Chen does not specifically mention the minimum size of its reticle pattern.

However, Leedy describes in col. 36 lines 34 to 40 describes making images in the size of 25um (L) and in col. 35 lines 9-10 describes the conformal layer of 2000 angstroms (i.e. less than 1/2 L thick) to allow application of inter connect metallization on both sides of I/C and a method by which thin films can be formed that allow efficient cooling of IC components of the circuit membrane and also formation of three dimensional structures through bonding of circuit membrane IC layers.

Therefore it would have been obvious to one of ordinary skill in the art to combine Leedy's image size (L) to conformal layer thickness (no more than $1/2L$) ratio in Chen's method to allow application of inter connect metallization on both sides of I/C and a method by which thin films can be formed that allow efficient cooling of IC components of the circuit membrane and also formation of three dimensional structures through bonding of circuit membrane IC layers. (Leedy col. 3 lines 50 to col. 4 lines 16).

Response to Arguments

Applicant's arguments filed 4/28/2003 have been fully considered but they are not persuasive for the following reasons :

Applicants' argument that Chen does not show a deposited layer that includes a reticle pattern is not persuasive because applicants' arguments are not consume rate in scope with the presently recited claims which merely recite, " the non resist deposited layer including reticle pattern" which ~~is~~ when read in light of the specification in pages 9 lines 13 to page 10 line 10 etc. it is clear as stated at least ~~1~~ above mentioned specification pages clearly shows that non resist deposited layer 20-10 and 202-11 of silicon dioxide, PSG, TEOS etc. are separate and distinct from the resist layer formed thereon(over the deposited non- resist layer) with a reticle pattern (specification page 9 last line and page 10 lines 1-3) . More specifically page 10 lines 1-3 recite, " ..A Step 204 may initially form a reticle pattern within a layer of resist. Such a pattern may then be transferred (sic.) underlying layers " and clearly seen from figures 2A to 2 D .

Therefore Applicants' contention that their deposited layer includes a reticle is identical to that described by the applied Chen reference which describes its nonresist deposited layer 14 of silicon dioxide, etc. (named a passivation layer) and a layer 16 formed (over layer 14) made from materials like Titanium nitride (col. 6 line 1) identical to that recited in Applicants' claims 1-4 (named a barrier layer) with resist having pattern that is exposed and etched to from a pattern as shown in figure 3.

Applicants' next contention that Chen teaches away from the recited invention because Chen allegedly stops pattern forming at the passivation layer (14) is not persuasive because none of the claims presently recite the method step of patterning any layer .

It is noted that the presently examined claims are device claims and therefore will not include a method step (patterning and where it occurs).

Applicants' next contention that the Chen reference does not show inspecting for reticle pattern defects because Chen is directed to aligning the position of the reticle with the previous layer on the wafer is not persuasive because Applicants' claims are entitled to broadest possible interpretation and as Applicants' have not specified the particular type of defect in the claims and in the specification page 12 lines 11 to 14 state : " It is further noted that by increasing contrast in a pattern under inspection , the present invention may also allow an inspection system to use wafer auto-alignment features during the initial inspection setup." (emphasis supplied).

Therefore Applicants' inspecting clearly includes the verification of alignment features at least in the initial inspection setup similar to that of the Chen reference and therefore Chen does not teach away but rather teaches similar inspection.

Thus all the presently recited limitations are taught by the applied reference/s.

With respect to claim 4 Chen in col. 6 lines 1-2 describes a titanium and titanium nitride layers. Multi layers of several materials like TaN formed over Ta/Al (col. 6 line 1, col. 6 like 6) and alternative materials include TiN formed over Al/Ti (col. 6 lines 1-3, etc.) .

With respect to claim 8 Chen in col. 5 lines 59-60 stated its layer (14- passivation layer) can contain undoped silicon dioxide/ silicon nitride deposited by CVD and substrates 10 (over which layer 14 is formed) can be made from several materials including PSG especially in SOI substrates.

With respect to claims 12,13,16 and 17-20 Applicants' repeat their arguments stated under claim 1 which were not found persuasive under claim 1 and not persuasive here also.

With respect to claim 5 Applicants' arguments that are repeat of their arguments stated under claim 1 above are not persuasive for reasons stated above under claim 1.


Applicants' arguments that Leedy teaches away from the recitations of claim 5 because Leedy allegedly teaches a patterning resist layers whereas claim 5 recites " the recticle pattern in the deposited layer " is not persuasive for several reasons (similar to that stated under 1 above) namely Applicants' claim when given broadest interpretation in light of the specification clearly shows its pattern being in the resist layers (Figs. 2 A

to D, pages 9 last line and page 10 lines 1-13, etc.). Therefore Leedy does not teach away from presently recited claim 5.

Therefore all of the Applicants' arguments are found to be not persuasive.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Steven H. Rao whose telephone number is (703) 306-5945. The examiner can normally be reached on Monday- Friday from approximately 7:00 a.m. to 5:30 p.m.

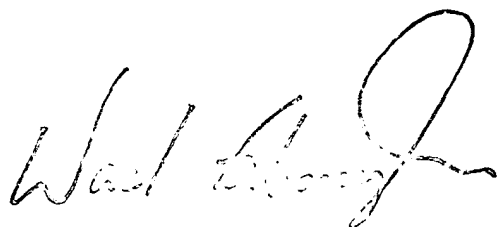
Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956. The Group facsimile number is (703) 308-7724.



Steven H., Rao

Patent Examiner

July 10, 2003.



SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800